VIEWPOINT

An Online Education Method for Movement Disorders During COVID-19: Opportunity and Experience

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The COVID-19 pandemic has brought many new challenges to the healthcare community, perhaps the least conspicuous of which has been to medical education. Trainees, including those in neurology, answered the call to provide care outside of their chosen specialty.[1] In response to social distancing guidelines by the Center for Disease Control and Prevention to minimize the risk of exposure, all didactics, workshops, and in-person conferences were disrupted for trainees. Before the pandemic, medical researchers had estimated that the collective amount of medical knowledge of a trainee would likely double every 73 days by 2020.[2] During the pandemic, trainees have found it increasingly difficult to expand on their existing medical knowledge and skills. The aging population and an increasing need for neurologists with expertise and comfort in movement disorders' care magnify the need for consistent and rigorous training.[3] Unsurprisingly, there is evidence to support that meaningful differences exist in the care provided by neurologists with and without training in movement disorders.[4,5] Training in movement disorders includes learning to adeptly recognize phenomenology and proceed with appropriate workup and management strategies based on the individual's clinical need. It further includes developing expertise in chemodenervation, and advanced therapies, including deep brain stimulation programming. The educational mission of movement disorders fellowship programs mandates that fellows be aware of the latest advancements in the field, including available therapeutic trials for their patients.

Key Words: COVID-19; education; movement disorders; online

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Relevant conflicts of interest/financial disclosures: Nothing to report.

Received: 23 February 2021; **Revised:** 4 April 2021; **Accepted:** 29 April 2021

Published online 2 June 2021 in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/mds.28648

Our survey, which included questions on the pre-COVID state of movement disorders education, highlighted gaps in depth, breadth, and consistency in education across fellowship programs (Fig. 1, Supporting Information S1) Forty-five percent of respondents reported that their training program hosts weekly didactics in movement disorders, with nearly 40% reporting a frequency of less than once a week. A quarter of respondents reported video rounds/video case discussions by their training program every 2 weeks, with 45% reporting an occurrence of once a month. Half the respondents reported monthly journal clubs, with little less than 25% reporting an even greater interval between them. Half of the respondents reported faculty (local or invited) presented movement disorders didactics at their institution less than once a month, with only 12% reporting a frequency of once a week.

With this article, we seek to present our experience with an online educational series aimed at addressing gaps in fellowship education magnified by the pandemic. By discussing fellow feedback, we further present the possibility of such an endeavor supplementing fellow training in a post-pandemic world.

The Intervention: A Nationwide Movement Disorders Virtual Educational Program

Inspired by a successful volunteer tele-education didactic series in neurology,[6] we sought to refine this approach toward the highly "visual" field of movement disorders. With input and guidance from a curriculum workgroup (led by S.C.), an online didactics program was developed for trainees. This workgroup consisted of a mix of faculty at various levels in their career as well as movement disorders fellows (acknowledgment). Collectively, ideas for topics were discussed and selected. Renowned experts within the field of movement disorders were invited to deliver a 1-hour interactive weekly virtual lecture on the topic of their expertise to interested trainees and neurologists. This provided a

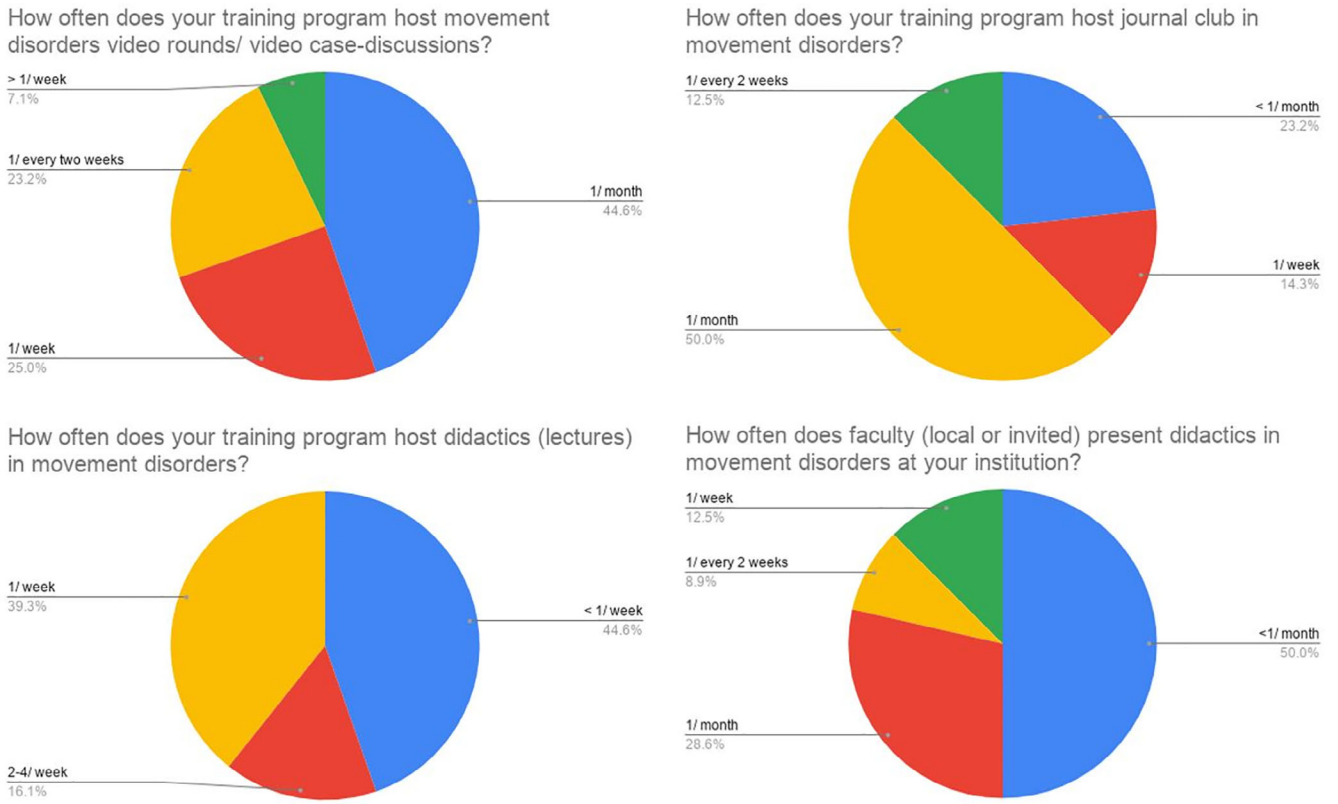

FIG. 1. Pre-COVID-19 state of movement disorders education. [Color figure can be viewed at wileyonlinelibrary.com]

unique opportunity to directly learn from leaders within the field on a weekly basis. Presenters shared videos to explain phenomenology and their approach to various types of clinical cases, considered a cornerstone of movement disorders training. The curriculum is available in Table 1. The schedule created for trainees incorporated the cognitive learning techniques of spaced retrieval and interleaving to enhance knowledge and retention. Spaced retrieval is the technique of presenting information on a particular topic repetitively but leaving a substantial amount of time between presentations. This leads to an increase in the amount of stored information and retention as compared to the conventional practice of learning a large amount of information on a particular topic all at once which is then rarely revisited.[7] Interleaving as a cognitive technique is the process of alternating between different modes of information (eg, panel discussions and case presentations). This has been shown to lead to longer-term retention and allows learners to build associations as they work to understand various concepts.[7] An email sharing news of an online weekly series was sent to movement disorders fellowship directors, encouraging participation from within their program and department. After commencement of the first cycle (Table 1), a semistructured survey with 18 questions evaluating topics such as pre-COVID education at home institution, the quality of the virtual education series, and opportunities for career improvement was designed (A.M., R.E., and S.C.) via Google forms. A sample of this survey instrument is available in Supporting Information S1. The survey did not meet the definition of human subject research per the University of Texas Southwestern Institutional Review Board (IRB) and therefore was exempt from IRB review.

The target of the survey included all neurology residents, movement disorders fellows, and practicing academic neurologists who attended the movement disorders virtual education series from March to June 2020. The first email was sent out in early November 2020, with three reminder emails until January 30, 2021. In addition, two emails spaced approximately a month apart were sent to the fellowship directors requesting response from eligible attendees in their training program. Data collection closed on February 1, 2021. In the case of multiple entries by the same individual, only the last one was included. We received 56 responses (56%), of which 52 identified themselves as fellows, 3 as residents, and 1 as faculty. The respondent sample size was lower than expected but consistent with trainee surveys.[8] Despite multiple reminders, we found it difficult to reach attendees who graduated from their fellowship programs and moved institutions at the end of the academic year in 2020.

TABLE 1 *Curriculum of the movement disorders virtual educational program*

Number	Topic	Speaker
1	Functional movement disorders	Prof. Alberto Espay
2	Drug-induced movement disorders	Prof. Richard Dewey
3	Nonmotor symptoms of Parkinson's disease	Prof. K. Ray Chaudhuri
4	Musician's dystonia	Prof. Steven Frucht
5	Pearls and pitfalls in cervical dystonia	Prof. Hubert Fernandez
6	Leadership and professional development	Prof. Shilpa Chitnis
7	Instructional cases in movement disorders	Prof. Stephen Reich
8	DBS in general sensing and closed-loop DBS	Prof. Helen Bronte Stewart
9	Parkinson's syndromes, clinical clues	Prof. Stephen Reich
10	Pearls and pitfalls in the treatment of selected movement disorders	Prof. Alberto Espay
11	Prodromal Parkinson's disease	Prof. Tanya Simuni
12	Dystonia	Prof. Cynthia Comella
13	Clinical approach to movement disorders/phenomenology	Prof. Steven Frucht
14	Deep brain stimulation in movement disorders	Prof. Michael S. Okun
15	The clinical spectrum of tremors	Prof. Stephen Reich
16	Myoclonus: recognition and treatment	Prof. Alberto Espay
17	Freezing of gait in Parkinson's disease	Dr. Mitra Afshari
18	Disease modification trials in Parkinson's disease	Prof. Tanya Simuni
19	Tauopathies	Prof. Irene Litvan
20	Palliative care in Parkinson's disease	Dr. Jori Fleisher
21	Etiology and pathophysiology of dystonia	Prof. Mark Hallett
22	Approach to chorea	Prof. Ruth Walker
23	General diagnostic approach and Rx of ataxia	Dr. Natalie Witek
24	Update on Huntington's disease	Dr. Martha Nance
25	Getting started in clinical trials research	Profs. Raj Pahwa, Hubert Fernandez, Tanya Simuni, and Robert Hauser
26	The case for reinventing Parkinson's disease	Prof. Alberto Espay
27	Integrative medicine in Parkinson's disease	Prof. Indu Subramaniam
28	When do disorders of movement become movement disorders	Prof. Alberto Espay
29	Pediatric movement disorders	Dr. Jeff Waugh
30	Movement disorders potpourri—learning from my instructive cases	Prof. Kailash Bhatia
31	Challenges and opportunities in Rx of orthostatic hypotension	Prof. Alberto Espay
32	Targeted therapies in Parkinson's disease	Prof. Susanne Schneider
33	Clinical trials in alpha synuclein therapy	Prof. Anthony Lang
34	Tic disorders	Prof. Joseph Jankovic
35	Movement disorders emergencies	Prof. Peter Lynch

Feedback on the Virtual Movement Disorders Educational Program

In response to the statement "The didactics provided met my expectations," nearly 60% of respondents "strongly agreed," with 37% "agreeing" with it (Fig. 2). None of the respondents disagreed. All respondents agreed (39%) or strongly agreed (61%) that the series covered an adequate breadth of topics. All respondents agreed (36%) or strongly agreed (64%) that the didactic topics were relevant to their educational needs. Whereas 67% of respondents strongly agreed with an excellent quality of lectures and delivery of the presenters, 28% agreed and 4% were neutral. All except one respondent agreed (41%) or strongly agreed (58%) with the statement, "The online didactics added to my clinical skills/clinical knowledge." Nearly equal number of respondents agreed or disagreed (45% each) with the series addressing educational gaps in their movement disorders training. All respondents agreed (33%) or strongly agreed (67%) with recommending this type of online learning to others. About half of the respondents felt the series allowed for future mentorship, with 12% in disagreement. Approximately 40% of respondents felt the series allowed for future collaboration, whereas 10% disagreed with that statement. Nearly 75% of respondents agreed (41%) or strongly agreed (31%) with the statement, "This experience allowed me to build a sense of community within my field." All but two respondents agreed (31%) or strongly agreed (59%) that this experience increased their exposure to leaders in the field. Half of the respondents strongly agreed and 31% agreed with the statement, "It was easy to interact/submit questions."

Additional feedback is available in Supporting Information S2.

Lessons from an Educational Experiment

The virtual movement disorders lecture series was born out of the need to continue consistent graduate medical education in movement disorders, which was at risk due to the pandemic and the necessary policies around it. Attendee responses show that it was successful in its intent. One attendee stated, "It really enhanced my education in what was otherwise a very challenging time."

The feedback highlighted substantial variability and discrepancy in the structure and breadth of movement disorders didactic education among fellowships across the country. Before the pandemic, only one in six respondents indicated that their program held at least weekly didactic sessions regularly. One attendee commented, "I do wish my program had structured didactics to facilitate learning. As such, I look forward to these virtual lectures every week." Another attendee reported, "It is by far and away the best didactic educational experience of my fellowship. I look forward to attending year after year if possible." All comments and criticism are available in Supporting Information S2. Our virtual series helped fill existing gaps in didactic education across training programs in the United States by expanding reach to experts in the field from across the world, covering a wide breadth of topics. Various overlapping topics were presented and revisited several weeks later in varying formats such as case presentations, video rounds, and discussions on clinical approach and management. Repetitively revisiting topics over time as well as in different modalities of presentation allowed for optimum learning and retrieval. It was envisioned, constructed, and executed with existing resources, minimal technological expertise, and no substantial technical difficulties. As such, it serves as an example of feasibility and promise of virtual educational content in movement disorders to all parts of the world with available internet. This educational series also served to provide a platform for junior faculty to present on topics of their interest and record of accomplishment. This idea was put forth by invited eminent speakers, thereby highlighting the culture of mentorship in movement disorders.

The survey highlighted several opportunities for improvement, the most consistent of which was the timing of the lectures. We found it challenging to identify a single time slot that was acceptable to attendees across all time zones in the United States. In the future, we seek to remedy this by recording these talks, with speaker permission, to be available for later viewing on an educational platform for a limited amount of time. This platform will be one in which those who are able to attend live lectures will have the added benefit of engaging with the presenter in a post-lecture question-and-answer session. Those who are unable to attend live lectures will have the opportunity to watch recorded lectures at a later time. Some fellows indicated greater interest in video rounds. A sizable proportion of respondents expressed inadequate opportunities for mentorship and collaboration. We aim at introducing greater interaction in future sessions, with senior and peer mentors to address this disadvantage. Greater representation of video rounds in the education curriculum is one such opportunity to address both these limitations. In addition to challenging case presentations by experts, we hope to engage movement disorders fellows and interested neurology residents with a platform to present interesting cases of their own for collective input and management strategies. This would provide them with an educational medium to actively engage with experts in phenomenology and clinical approach. These interactions may serve as the basis for future collaborative efforts.

Anecdotal feedback indicated that the occurrence of "live" lectures with the opportunity for discussion

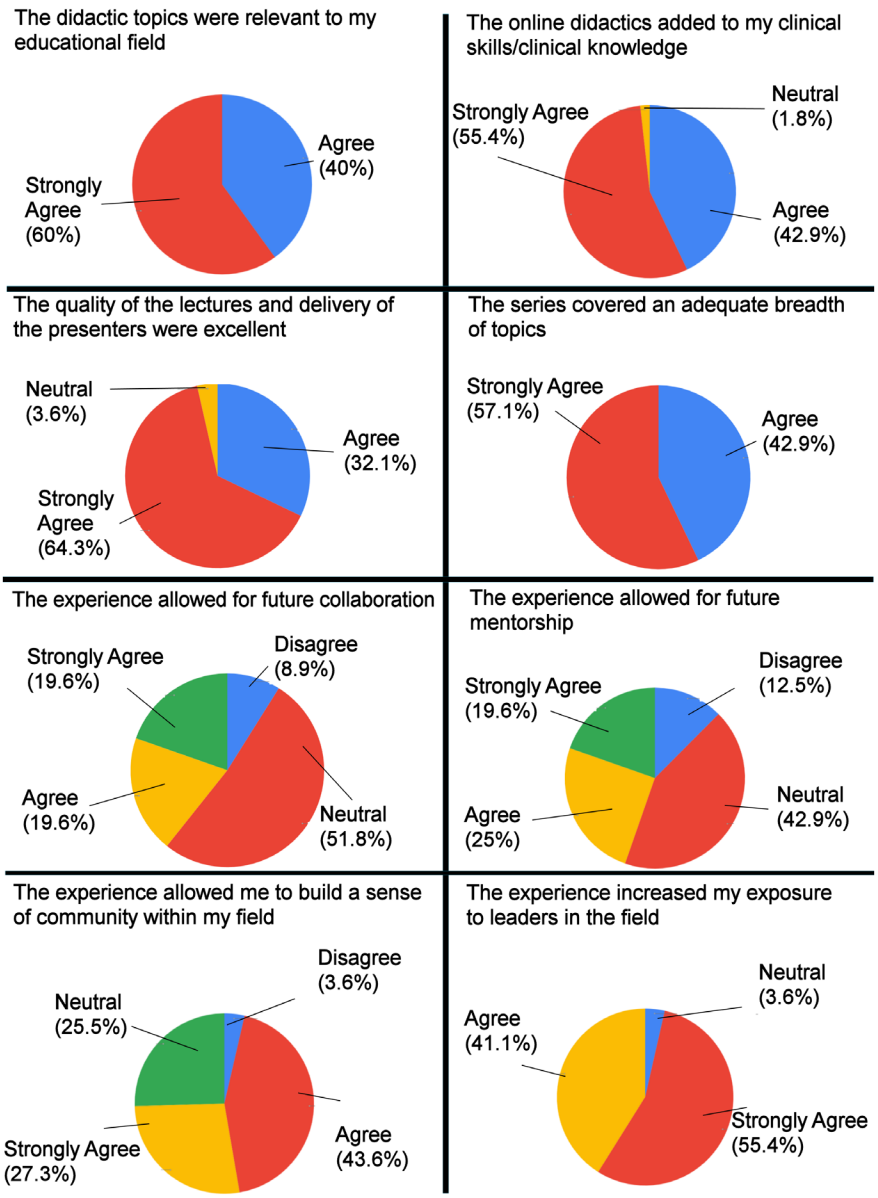

FIG. 2. Feedback on the virtual movement disorders educational program.

afterward made these didactics novel and engaging, complimentary to the excellent and exhaustive educational material available free of charge to trainees through the International Parkinson's Disease and Movement Disorders Society.[9] It is critical that clinical training programs continue to use and adapt educational strategies to maximize learning required to apply knowledge and skills in caring for patients. We hope to build on existing curricula[10] and continue adapting this virtual curriculum and presentation in response to feedback while embracing the principles of spaced retrieval and interleaving. A virtual educational platform has potential utility as a learning tool to supplement and strengthen movement disorders training education in the future, beyond the current pandemic. While our efforts were successfully aimed at medical education in the United States, such a platform has the potential for an international reach throughout the year, supplementary to conferences. ●

Acknowledgments: We would like to acknowledge the following persons for their input on the curriculum: Drs. Stephen Reich, Nicholas Galifianakis, Amie Hiller, Danielle Larson, Christopher Hess, Lauren Seeberger, Debra Ehrlich, Laurice Yang, Mitra Afshari, Svjetlana Miocinovic, Irene Malaty, Sara Schaefer, and Anhar Hassan as well as physician assistants, Sarah Smith and Lauren Lanford, and nurse practitioner, Juliana Atem.

References

1. AlGaeed M, Grewal M, Richardson PK, Leon Guerrero CR. COVID-19: Neurology residents' perspective. J Clin Neurosci 2020; 78:452–453.

2. Densen P. Challenges and opportunities facing medical education. Trans Am Clin Climatol Assoc 2011;122:48–58.

3. Dorsey ER, George BP, Leff B, Willis AW. The coming crisis: obtaining care for the growing burden of neurodegenerative conditions. Neurology 2013;80:1989–1996.

4. Cheng EM, Swarztrauber K, Siderowf AD, et al. Association of specialist involvement and quality of care for Parkinson's disease. Mov Disord 2007;22:515–522.

5. Dorsey ER, Voss TS, Shprecher DR, et al. A U.S. survey of patients with Parkinson's disease: satisfaction with medical care and support groups. Mov Disord 2010;25:2128–2135.

6. Weber DJ, Albert DVF, Aravamuthan BR, Bernson-Leung ME, Bhatti D, Milligan TA. Training in Neurology: Rapid implementation of cross-institutional neurology resident education in the time of COVID-19. Neurology 2020;95:883–886.

7. Winn AS, DelSignore L, Marcus C, et al. Applying cognitive learning strategies to enhance learning and retention in clinical teaching settings. MedEdPORTAL 2019;15:10850.

8. Phillips AW, Friedman BT, Utrankar A, Ta AQ, Reddy ST, Durning SJ. Surveys of health professions trainees: prevalence, response rates, and predictive factors to guide researchers. Acad Med 2017;92:222–228.

9. Society IPsdaMD. MDS Education Roadmap. https://www.movementdisorders.org/MDS/MDS-Education-Roadmap.htm. Accessed February 8, 2021.

10. Neurology AAo. American Academy of Neurology Movement Disorders Section Resident Core Curriculum. https://www.aan.com/siteassets/home-page/tools-and-resources/academic-neurologist-researchers/teaching-materials/aan-core-curricula-for-program-directorstor/movement-resident-core-curriculum_tr.pdf. Accessed March 9, 2021.

Supporting Data

Additional Supporting Information may be found in the online version of this article at the publisher's web-site.